

# ABSTRACT

An object of the present invention is to provide a method of operating a nuclear reactor, which is capable of effectively suppressing the initiation and growth of SCC of reactor structural members of a BWR without increasing the dose rate of a main steam system and thereby reducing radioactivity of reactor water, by carrying out, at a suitable period, a control for injecting hydrogen in the reactor water while adjusting the pH of the reactor water on the alkali side.

According to a first invention, the pH at room temperature of reactor water is controlled in a range of  $8.5 < \text{pH} \leq 9$  at the beginning stage of start-up operation of one operating cycle, and then controlled in a range of  $7 < \text{pH} \leq 8.5$  until shutdown operation; and the hydrogen concentration of the reactor water is controlled in a range of 30 to 100 ppb throughout the operating cycle.